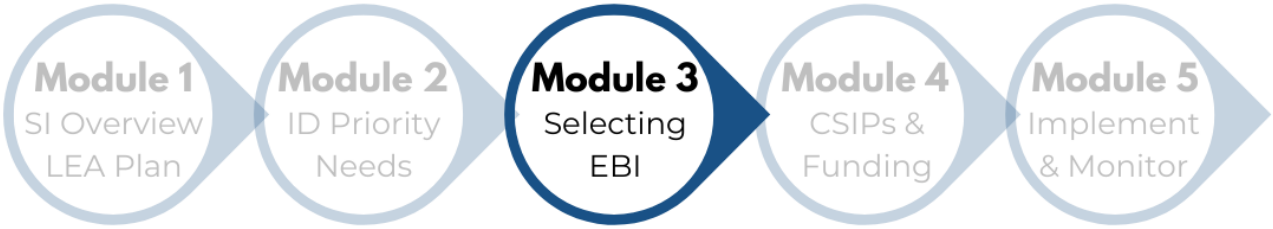
Rhode Island Practitioners' Guide to School Improvement 2019-2020

Module 3: Evidence-Based Interventions

Objective:



To develop a framework for understanding how to use evidence throughout the school improvement process and to go through the process for selecting high-quality evidence-based interventions.

Module 3 Contents:

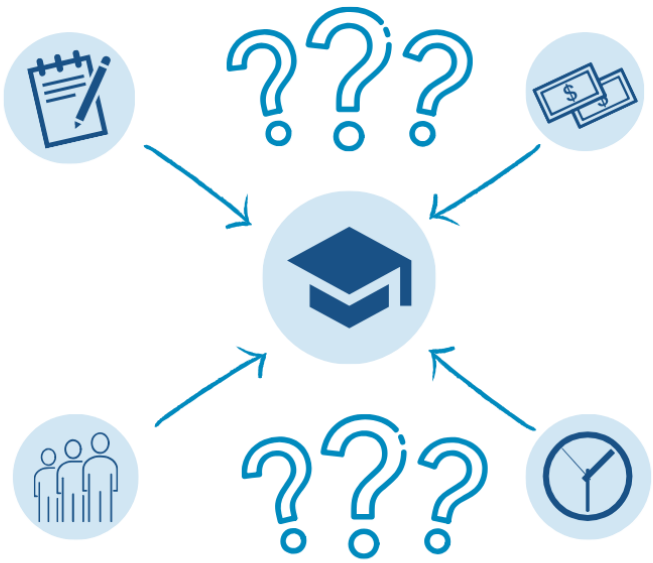
Module 3 Deliverables:

3.a List of Evidence-Based Interventions

Module 3 Appendix:

I. Sources for Evidence
II. Evidence Review Tool

How do we know?



Evidence

In a world of limited resources, energy, and time, **evidence** allows us to determine which strategies, programs, and interventions have the highest likelihood of ensuring student success. Every decision we make in improving schools should be grounded in **evidence**. We should always ask: **how do we know?** The answer at every step of the school improvement process, from the needs assessment to interventions, is **evidence**.

Evidence Based Decision-making

Needs Assessment and RCA

Who are we?
The Needs Assessment and Root Cause Analysis help provide critical contextual evidence that forms the background for considering what might work best in our specific context. We have to know who we are before we know what we can be.

Experiential Evidence

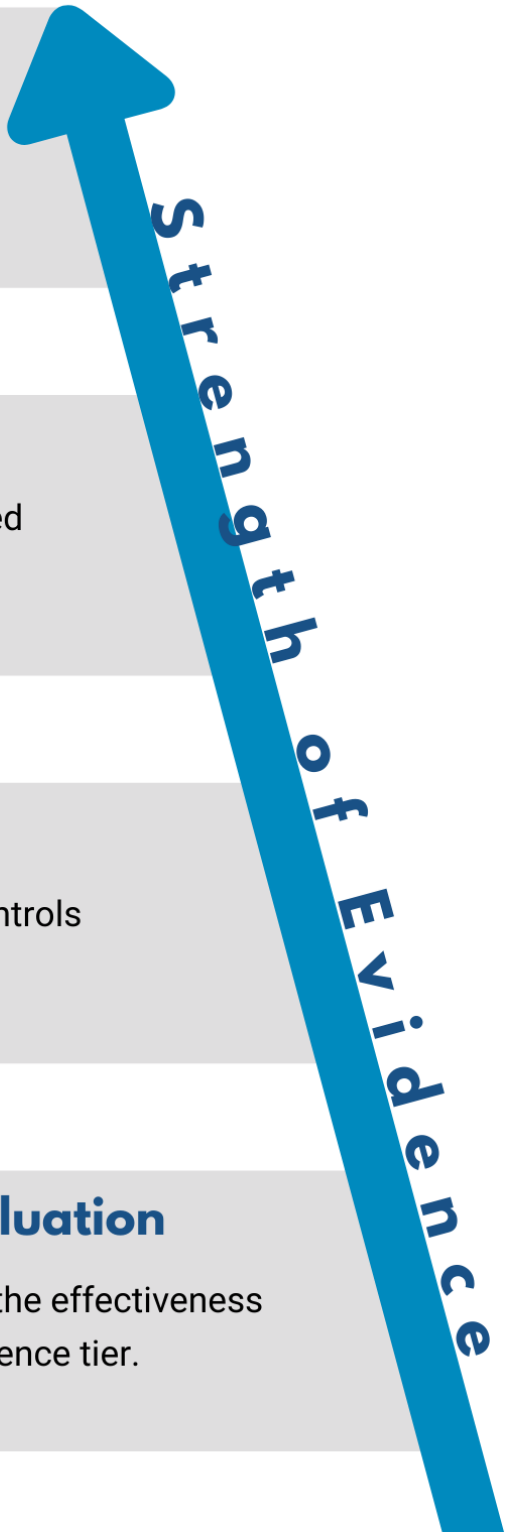
What's happening?
Developed from the experiences of students, families teachers, and administrators, experiential evidence provides insight on successes, strengths, deficiencies, and needs.It allows us to collect data on what's actually happening in our school.

Research Evidence

What works?
After we know who we are and how we can improve, we can use scientific research to weigh which strategies, interventions, and programs are most likely to improve outcomes and experiences for our students. Research allows us to use strategies that have been proven to be successful.

Tiers of Research Evidence

The Needs Assessment and Root Cause Analysis provide valuable in-house evidence that can be used to develop our school improvement plan. But, after looking internally we also have to examine what types of programs, initiatives, and strategies have been researched and tested in other schools across the country. Taking what we know about ourselves and what we know about interventions in other places, we can find interventions that will ensure the highest likelihood of success for our students. Below are our four tiers for the different types of evidence available that can be used for finding interventions.



TIER 1

Strong Evidence

Experimental study that uses as randomized control trial.
***CAN** determine causation.*

TIER 2

Moderate Evidence

Quasi-experimental study like matched groups or interrupted time series.
***CAN** determine causation.*

TIER 3

Promising Evidence

Correlational study with statistical controls for selection bias.
***CANNOT** determine causation.*

TIER 4

Strong Theory Under Evaluation

Includes **ongoing efforts** to establish the effectiveness of the intervention and bolster its evidence tier.
***CANNOT** determine causation.*

Module 3.1 Framework for Understanding Evidence

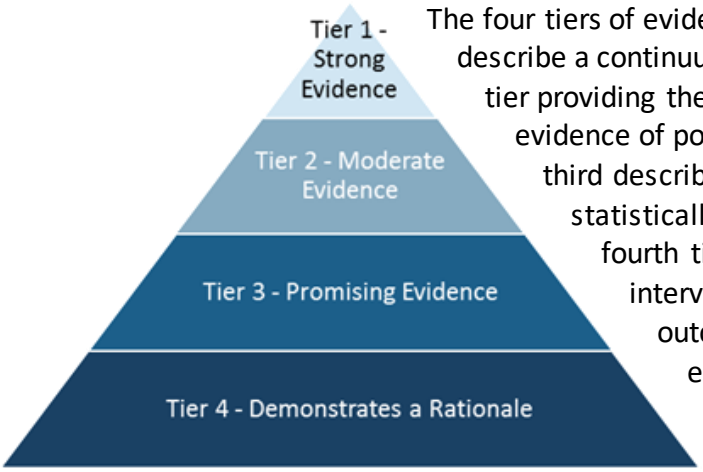
In a world of limited time and resources, educators can use evidence to find interventions, strategies, and initiatives that have the highest likelihood of success for students. Evidence provides the basis for discussing what works and what doesn't, and it empowers educators to discern how to invest resources in interventions that have the best chance of moving the needle on student outcomes and student experiences.

Not all evidence, however, is created equal. The following pages contain the framework for understanding different tiers of evidence. Some evidence, such as randomized trials, allows researchers to establish clear causation while other forms of evidence, such as a correlational studies, can provide some insight into real world relationships, but cannot clearly establish causality. The task for schools, then, is to understand and distinguish between these different types of evidence to find interventions and strategies that align with their goals and context.

Background of Evidence-Based Interventions

In its earliest inception, the Elementary and Secondary Education Act (ESEA) required all federally funded interventions to be grounded in research but did not specifically define what "research" had to entail. When amended by NCLB, the law further stipulated interventions were to be supported by "scientifically-based research." Finally, the Act as amended by ESSA requires or recommends interventions be supported on the basis of evidence and stipulates four tiers of such evidence-based support (Section 8101(21)(A)).

Module 3.2 Tiers of Evidence-Based Interventions



The four tiers of evidence-based interventions defined in ESSA describe a continuum of methodological rigor with the first tier providing the most rigorous, statistically significant evidence of positive student outcomes. The second and third describe progressively less rigorous but still statistically significant evidence of the same. The fourth tier provides a clear rationale that the intervention could lead to positive student outcomes and is undergoing continuing efforts to examine the impact of the intervention in question.

The table below, adapted from Chiefs For Change outlines in greater detail the four tiers of evidence-based support. Following the table are in-depth descriptions and examples for each of the four tiers. This framework will form the foundation for finding and selecting specific evidence-based interventions.

Category One: "Demonstrates statistically significant effect on student outcomes or other relevant outcomes." *Required for funding under School Improvement (Sec. 1003). A comparison table on page 3 provides information on requirements across all Federal Programs in the CRP.*			**Category Two**: "Demonstrates a rationale based on high quality research findings or positive valuation that such activity, strategy, or intervention is likely to improve student outcomes or other relevant outcomes."
Tier 1: **Strong Evidence**	**Tier 2:** **Moderate Evidence**	**Tier 3:** **Promising Evidence**	**Tier 4:** **Strong Theory Under Evaluation**
Supported by at least one well-designed, well-implemented experimental study (randomized-control trials).	Supported by at least one well-designed, well-implemented quasi-experimental study (matched groups, interrupted time series)	Supported by at least one well-designed, well-implemented correlational study with statistical controls for selection bias	Includes ongoing efforts to establish the effectiveness of the intervention and bolster its evidence tier.

The table below summarizes the four tiers of evidence in brief. Following this table are in-depth descriptions of each evidence tier.

	Evidence Type	Description	Power	Outcomes
Tier 1	**Strong Evidence:** Randomized Control Experiment	Has treatment and control group, uses random assignment.	Demonstrates Causation	Statistically significant, positive results
Tier 2	**Moderate Evidence:** Quasi-Experiment	Has treatment and control group, but they are NOT randomly assigned.	Demonstrates Causation	Statistically significant, positive results
Tier 3	**Promising Evidence:** Correlational Study	Examines relationship between treatment and outcome but does not establish causation.	Cannot Demonstrate Causation	Statistically significant, positive results
Tier 4	**Theory Under Evaluation:** Logic Model	Identifies key components of proposed intervention, describes relationship between components and relevant outcomes.	Cannot Demonstrated Causation	Ongoing effort to study

Tier 1 – Strong Evidence (Experimental Study)

- Randomized control experiment (i.e., has treatment and control group, uses random assignment)
- Large sample – at least 350 students or other units
- More than one site (school, district, or state)
- Produces a statistically significant, positive outcome
- Relevant to your context (i.e., similar student population/setting)
- **Example**: Researchers conducted a randomized control trial where Principals were randomly assigned to the treatment group or control group. The treatment group received training on lesson planning, data-driven instruction, and teacher coaching while the control group received no training. This study involved 58 different schools serving several thousand students in an urban district. There were multiple statistically significant, positive impacts on student test scores.

Tier 2 – Moderate Evidence (Quasi-Experimental Study)

- Quasi-Experimental design (i.e., has treatment and control group, **but they are NOT randomly assigned**)
- Large sample – at least 350 students or other units
- More than one site (school, district, or state)
- Produces a statistically significant, positive outcome
- Relevant to your context (i.e., similar student population/setting)
- **Example**: Researchers used a quasi-experimental design to match statistically similar control classrooms with classrooms that had teachers with an NBST certification. In this case, the control classrooms did not have an NBST certified teacher, while the treatment classrooms did have an NBST certified teacher. This study encompassed 1,312,657 students in grades 3-8 across Washington Stata and found statistically significant, positive outcomes for math achievement in classrooms with an NBST certified teacher.

Tier 3 – Promising Evidence (Correlational Study)

- Correlational study (i.e., examines relationship between treatment and outcome, but does not establish causation)
- Uses statistical controls for selection bias
- Produces a statistically significant, positive outcome
- **Example:** Researchers conducted a correlational study that examined the relationship between professional learning and instructional practices. There were no treatment or control groups, and the researchers were trying to examine whether receiving professional learning and coaching was associated with increased knowledge of instructional practices for teachers and increased outcomes for students. This study involved 165 educators and thousands of students across Mississippi and found positive relationships between professional learning and instructional practices.

Tier 4 – Demonstrates a Rationale (Logic Model + Research + Effort to Study)

- Logic model (i.e., identifies key components of proposed intervention, describes relationship between components and relevant outcomes)
- Relevant research or intervention ***suggests*** improving relevant outcomes is ***likely***
- Includes an effort to study the impact of the intervention (or points to one happening elsewhere)
- Consider including fidelity of implementation
- **Example:** A school is considering allocating specific funds for ELA Coaches. To qualify for Tier 4, they must develop a logic model, use research and evidence as a basis for the strategy, and document ongoing efforts to study the activities.
    - **Logic Model**
        - Must explain the coaching activities that ELA coaches will undertake, name the outcomes expected from this intervention, and link activities to outcomes
    - **Research Base**
        - A study that shows impact of feedback on teachers is positive. It is an easy leap to link this to the impact of a coaching program specific to ELA
    - **Effort to Study**
        - Clear evaluation strategy to assess the impact of the ELA coaching. Details on how changes in outcomes will be measured and how these changes will be attributed to the specific intervention.
        - Refers to a similar evaluation happening in another school/district

Module 3.3 Utilizing Evidence-Based Interventions

There are two common approaches to searching for evidence-based interventions, and it's important for schools to determine how they want to set out on this journey.

The first way schools can begin an evidence search is to start broadly with a desire to improve student outcomes and then search for strategies and interventions that have been shown to improve outcomes across a variety of disciplines, school-types, grade levels, or contexts. In starting with a broad focus on improvement, schools can then find specific evidence-based interventions that demonstrate a high likelihood of success in their specific context.

The second way for schools to begin is to start with a specific intervention, and search for evidence on the effectiveness of that specific intervention. This path works well for schools that know they want to increase outcomes in a specific grade or subject area. Both of these paths can ultimately result in finding a successful evidence-based intervention, and the key first step for schools is determining which path most aligns with school goals and school vision.

Requirements for Evidence-Based Interventions

There are several different resources that schools can used to search for evidence. Interventions carried out and supported by funding from Title I, Section 1003 (School Improvement) must use evidence from our first three evidence tiers - strong, moderate, or promising. All other activities under Titles I-IV may use all four tiers of evidence as support for selected interventions.

The following resources can assist LEAs in locating research to provide a more rigorous evidence base for funding applications:

- What Work Clearinghouse
- Results First Clearinghouse
- Best Evidence Encyclopedia
- RAND Report of School Leadership
- Google Scholar provides a simple way to broadly search for scholarly literature.
- ERIC is an internet-based digital library of education research and information sponsored by the Institute of Education Sciences (IES) of the USDOE. ERIC provides access to bibliographic records of journal and non-journal literature from 1966 to the present.

Many studies and resources also include tools for implementing the intervention or program being tested. These tools can include things such as plans for program design, survey templates, or implementation guides. These are often free and can greatly enhance the effectiveness and ease of implementing a specific evidence-based intervention.

After finding an evidence for a specific intervention, it is important to remember that not every study or piece of evidence will align with the four evidence. It is crucial, therefore, that LEAs rigorously interrogate potential evidence to ensure alignment with the four tiers of evidence.

Module 3.4 How to Assess Evidence

While there are many qualities of research studies that must be considered in general, there are three components of every study or piece of evidence that are of special concern. Below these three areas are accompanied by specific questions that educators and schools can use to assess a piece of evidence and determine how it fits within the four tiers of evidence and how it might impact student outcomes.

1. **Prevalence of findings**
    - Are the findings in the study at hand consistent with other studies of the same intervention?
    - Does this study have statistically significant effects on student outcomes?
    - Are there any other similar studies that present significant negative effects?
    - Are these findings in-line with accepted best-practices?
    - Do these findings contradict conventional wisdom? If so, how?
2. **Sample Size**
    - How large was the population in the study?
    - Were the findings in the study from several sites or trials to reduce sampling error?
    - Were individuals randomly assigned to receive treatment?
    - Were control and treatment groups similar in characteristics?
3. **External Validity**
    - Is the context of the study similar to our own?
    - Does the population in the study match the population in which this intervention would be implemented?
    - Were they able to establish causality in the study? If so, how?
    - Do we have the capacity and resources to implement this intervention as it was designed in the study?

In general and when possible, educators and policy makers should consider the broadest body of evidence available when considering and selecting interventions and not rely solely on the minimum requirement of one well-designed and implemented study established in law.

Assessing Evidence in Practice

Returning to our four tiers of evidence, we can use the examples provided for each evidence tier to apply some of our investigative questions and to examine common pitfalls and cautions.

Tier 1 – Strong Evidence (Experimental Study)

- **Example**: Researchers conducted a randomized control trial where Principals were randomly assigned to the treatment group or control group.
- **Questions to Consider:**
  - Does the setting of this study match my own?
  - Do I have the resources to implement this with fidelity to the original design?
  - How significant were the findings?
  - Was it truly randomized?
- **Potential Pitfalls and Cautions:**
  - Was there contamination in the study? Did individuals receive the coaching who were not supposed to? Or did members of the treatment group share information with members of the control group in a way that would influence results?
- **Broader Considerations:**
  - Randomized experiments are the gold-standard for evidence and can typically provide the best evidence for specific interventions. However, it's important to consider results from multiple, similar studies.

Tier 2 – Moderate Evidence (Quasi-Experimental Study)

- **Example**: Researchers used a quasi-experimental design to match statistically similar control classrooms with classrooms that had teachers with an NBST certification.
- **Questions to Consider:**
  - How relevant is the study to my context?
  - How do these results compare with other, similar studies?
- **Potential Pitfalls and Cautions:**
  - Were the treatment and control groups truly similar? Can the results be attributed to anything other than the NBST certification, such as class size, school type, or student characteristics?
- **Broader Considerations:**
  - Quasi-experiments present a great opportunity for studying real-world questions and interventions. However, since treatment and control groups are not randomly assigned, it's crucial that researches clearly demonstrate their process for eliminating bias and potential influence from outside factors.

Tier 3 – Promising Evidence (Correlational Study)

- **Example:** Researchers conducted a correlational study that examined the relationship between professional learning and instructional practices.
- **Questions to Consider:**
  - How did they use statistical controls to ensure results were not biased?
  - How does this demonstrated relationship provide insight for potential interventions in my school?
  - Can the results be applied beyond the specific subjects of the study?
- **Potential Pitfalls and Cautions:**
  - How did researchers try to eliminate bias in their results?
  - Could other, unaccounted for, factors be influencing results?
  - How do we know that the relationship isn't just random?
- **Broader Considerations:**
  - Correlational studies can provide great insight into real-world relationships. However, these studies cannot determine causation and, therefore, need to be approached with a great deal of care and thoughtfulness. Researchers need to clearly demonstrate the rationale behind the relationship and clearly show how they are accounting for outside factors.

Tier 4 – Demonstrates a Rationale (Logic Model + Research + Effort to Study)

- **Example:** A school is considering allocating specific funds for ELA Coaches.
  - **Questions to Consider:**
    - Does the logic model clearly explain the exact activities and outcomes?
    - Do we have the resources to fully implement this program?
  - **Potential Pitfalls and Cautions:**
    - Is there a strong research base for this intervention? And, are there multiple sources that lend credence to the likelihood of success?
    - Is the method for evaluation clearly defined, and is it doable in our school context?
  - **Broader Considerations:**
    - It's crucial that all components of the intervention are explicitly linked, from inputs to outcomes to measurement, and that the research base provides clear rationale for the likelihood of success.